

## STRUCTURES AND CLASSIFICATIONS OF $HX$ RINGS

Zhang Zhenliang

In [1] the concept of  $HX$  ring has been raised firstly, and some basic results have been obtained. In this paper the structures of  $HX$  ring are described systematically, and attempts are made to classify the  $HX$  rings by their zero element. Finally, the chains of subrings and the ideal chains of each class are constructed.

## VARIOUS BURST ERROR DETECTING CODES

Bal Kishan Dass, Sapna Jain

In this paper, we study Cyclic codes detecting various kinds of errors. The types of bursts considered are Open Loop, CT Open Loop, Low Density Open Loop and Low Density CT Open Loop. A comparative study of the results obtained in this paper with the earlier known results and among themselves has also been made.

## ANALOGUE OF THE BHATTACHARYYA MATRIX IN NATURAL EXPONENTIAL FAMILIES (NEF)

G.R. Mohtashami Borzadaran

Sankaran (1964) established analogue of the Bhattacharyya matrices via the Raja Rao's (1958) result. In this paper, establish result related to the diagonality of the  $2 \times 2$  analogue of the Bhattacharyya matrices.

## A MAXIMUM ENTROPY APPROXIMATION METHOD FOR SEMI-INFINITE MINIMAX PROBLEM

M.I. Ageel

This paper presents a maximum entropy approximation method for solving the nondifferentiable semi-infinite minimax programming problem. By using the maximum entropy principle, the discretized original problem is transformed into a smooth programming problem. The resulting problem can easily be solved by making use of effective smooth nonlinear programming algorithms. A proof of the convergence of the method is also presented.

## APPLICATIONS TO THE EXACT ESTIMATES THEORY

Ileana Armeanu

The below-described method of our paper was used for a certain family of probability distributions, *the exponential family* (often referred to as Darmois or Koopman family), which comprises most of the known probability laws and whose importance is essential in statistics. It must be mentioned that the name of "exponential family" has nothing to do with the exponential probability law. A probability law,  $P_\theta$  with  $\theta \in \Theta$ , with the density of probability  $f(x, \theta)$  is supposed to belong to the exponential family (see [11]) if there exists a natural number  $r$  and the functions:

$$a_j(\theta), T_j(x) \text{ with } 1 \leq j \leq r, \text{ and also } c(\theta), h(x) \text{ (with } h(x) > 0)$$

so that

$$(1.1) \quad f(x, \theta) = c(\theta)h(x)e^{\sum_{j=1}^r a_j(\theta)T_j(x)}$$

According to the way of presenting (1.1), and also taking into account the factorizing theorem (Fisher-Neyman), it is obvious that the  $(T_1, T_2, \dots, T_r)$  statistics is a sufficient statistics. For a sample of volume

$n$ , we have:

$$(1.2) \quad f(x_1, x_2, \dots, x_n, \theta) = c^n(\theta)h(x_1)h(x_2)\dots h(x_n) \exp \left[ \sum_{j=1}^r a_j(\theta) \sum_{j=1}^n T_j(x_j) \right]$$

It is obvious that the statistics  $\left( \sum_{i=1}^r T_1(x_i), \dots, \sum_{j=1}^n T_r(x_j) \right)$  is sufficient. In 1974, Thomas Höglund [5] issues a study on the exact estimates for the exponential family.

## SOME REMARKS ON A TOPOLOGICAL MONAD

**I. Pop, Gh. Radu**

In this Note we consider the monad from the strong shape theory whose Kleisly category is the coherent homotopy category  $CH(\text{pro-Top})$  [4, Ch.I, §5]. Studying the adjoint pair of functors defined by this monad we obtain that the coherence functor  $C : H(\text{pro-Top}) \rightarrow CH(\text{pro-Top})$  admits a right adjoint and it is faithful and the cotelescope system functor  $\underline{T} : CH(\text{pro-Top}) \rightarrow H(\text{pro-Top})$  is also faithful.

## THE $L$ -FUZZY CORSINI JOIN HYPEROPERATION

**K. Serafimidis, Ath. Kehagias, M. Konstantinidou**

Corsini has defined a hyperoperation  $\cdot$  through a fuzzy set and has shown  $\cdot$  to be a *join* hyperoperation. This hyperoperation can be generalized so that it can be defined in terms of an *L-fuzzy* set. We explore the generalized hyperoperation and give sufficient conditions for the resulting hyperstructure to be a hypergroup and/or a join space.

## ROUGH POLYGROUPS

**B. Davvaz**

In this paper we shall give some properties of the lower and upper approximations with respect to the normal subpolygroups of a polygroup. In particular, we shall introduce the notion of a rough subpolygroup.

## QUASI-IDEALS OF RINGS OF STRICTLY UPPER TRIANGULAR MATRICES OVER A FIELD

**Yupaporn Kemprasit, Pattita Juntarakhajorn**

Let  $F$  be a field,  $n$  a positive integer and  $SU_n(F)$  the ring of all strictly upper triangular  $n \times n$  matrices over  $F$ . In this paper, the following statements are proved. The ring  $SU_n(F)$  has the intersection property of quasi-ideals if and only if  $n \leq 3$ . If  $\text{char}(F) = 0$ , the ring  $SU_n(F)$  has no minimal quasi-ideal. If  $\text{char}(F) > 0$  and  $n \leq 3$ , then for  $A \in SU_n(F)$ ,  $(A)_q$ , the quasi-ideal of  $SU_n(F)$  generated by  $A$  is minimal if and only if  $\text{rank}(A) = 1$ . For the case that  $\text{char}(F) > 0$  and  $n > 3$ , if  $A \in SU_n(F)$  is such that  $\text{rank}(A) = 1$ , then  $(A)_q$  is a minimal quasi-ideal of  $SU_n(F)$ , but the converse is not true.

## GENERALIZED RINGS

**M.R. Molaie**

In this paper generalized ring as a new mathematical structure is considered. Two methods for constructing generalized rings are presented. One of these methods contains a new concept of coset spaces.

## **A NEW PROOF OF LEVY'S THEOREM**

**Javad Mashreghi**

It is known that if a continuous function  $f$  defined on the unit circle  $\mathbb{T}$  has absolutely summable Fourier coefficients, and  $h$  is analytic in a neighborhood of  $f(\mathbb{T})$ , then  $h \circ f$  has also absolutely summable Fourier coefficients. Here, we use the power series representation of analytic functions to give a new proof of this result due to Levy.

## **SOME PROPERTIES OF (LOCALLY) $n$ -NILPOTENT AND $n$ -SOLUBLE GROUPS**

**Mohammad Reza R. Moghaddam, Gholam Hossein Eghdami**

In 1983, Fay and Walls introduced the concepts of  $n$ -abelian and  $n$ -potent groups. Then Moghaddam, Sedghi and Taheri (1999) extended the concepts to  $n$ -nilpotent and  $n$ -soluble groups and gave some of their properties. In this paper we present some more properties of such groups and also give some of their local behavior, similar to the results of Mal'cev and McLain.

## **MULTIPLE OBJECTIVES OPTIMIZATION APPLICATION IN EIGENSTRUCTURE ASSIGNMENT**

**Farshadnia Reza**

The eigenstructure assignment design approach has been widely accepted by the aerospace control engineering community. However, shortcomings of the direct approach include its unnecessary reliance on the specification of precise closed-loop eigenvalue locations for the final design and its inability to adequately incorporate other objectives such as eigenvalue sensitivity in the design. This paper addresses these shortcomings and suggests solution approaches based on a multiobjective optimization scheme. Its practicality is demonstrated through examples and it is also shown to be suitable for incorporation in computer aided control system design software.

## **AN ANALYSIS OF A PARABOLIC PROBLEM WITH A GENERAL (NON-LOCAL AND GLOBAL) SUPPLEMENTARY LINEAR CONDITIONS. I**

**N. Aliev, S.M. Hosseini**

In this paper we discuss the existence and uniqueness of  $u_t = \Delta u + f(x, t)$ , where  $t \geq 0$ ,  $x \in D \subset \mathbf{R}^2$  and  $D$  is bounded,  $\partial D$  the boundary of  $D$  is a Lyapunov curve. First we apply the Laplace transform to obtain its corresponding boundary value problem. Then, although Vladimirov [1] mentioned that it is not possible to use the second formula of Green to obtain a solution for BVPs, we have been able to use this formula and the fundamental solution of the BVP and its derivatives to show that its solution corresponds to the solution of a second kind Fredholm system [2] in which the kernel is at most weakly singular. We also had to treat, in an elegant way, some singularities which occurred in the essential conditions of the problem. The details of existence and uniqueness appears in part 2 of this paper which appears in the sequel.

## **ALGEBRAIC CHARACTERIZATIONS OF SOME DISCONNECTED SPACES**

**F. Azarpanah, O.A.S. Karamzadeh**

It is shown that  $X$  is an extremally disconnected space if and only if  $C(X)$  is a Baer ring. We also give several new algebraic characterizations of basically disconnected spaces. These characterizations are then used to give a unified proof of the fact that  $X$  is extremally (basically) disconnected space if and only if  $\beta X$  is extremally (basically) disconnected space. Zero-dimensional and strongly zero-dimensional spaces are also characterized similarly. It is shown that  $X$  is strongly zero-dimensional  $F$ -space if and only if each minimal prime ideal in  $C(X)$  is generated by idempotents. We also show that  $X$  is an extremally disconnected  $P$ -space with a dense set of isolated points if and only if  $C(X)$  is isomorphic to a direct product of fields. Finally, we prove that  $C(X)$  is a self injective ring if and only if  $X$  is an extremally disconnected  $P$ -space.

## HIGH-DENSITY BURST ERROR-LOCATING LINEAR CODES

Bal Kishan Dass, Gangmei Sobha

Lower and upper bounds are presented on the number of parity-check digits required for a linear code that locate a single sub-block containing errors which are in the form of high-density bursts.

## CLASSIFICATIONS OF HYPER *BCK*-ALGEBRAS OF ORDER 3

R.A. Borzooei, H. Rezaei, M.M Zahedi

In this paper first we review the notion of hyper *BCK*-algebra which is a generalization of *BCK*-algebra, also we give some properties of this notion. Then we give the concepts of (strong) hyper *BCK*-ideals and hyper *BCK*-algebras which satisfy the simple or normal conditions. After that by considering the notion of an isomorphism between two hyper *BCK*-algebras, we distinguish all of hyper *BCK*-algebras of order 3, which satisfy either the simple condition or the normal condition. In fact there are 19 hyper *BCK*-algebras of order 3 up to isomorphism.

## HYPERGRAPHS AND JOIN SPACES

Ali Reza Ashrafi, Ali Hossein Zadeh, Morteza Yavari

In [7], Corsini gives a method for constructing join spaces from hypergraphs. Using this method, we construct some join spaces from hypergraphs. If  $s$  is a function from  $G$  into a bounded lattice  $L$ , then we define the hyperoperation  $\star$  by,

$$a \star b = \{g \in G \mid s(a) \wedge s(b) \leq s(g)\}.$$

We prove that if the image of  $G$  is a sublattice of  $L$ , then  $(G, \star)$  is a join space. Also, we prove that, if  $A$  is an abelian group,  $s$  is a function from  $G$  into  $A$  and the image of  $G$  is a closed subset of  $A$ , then  $(G, \square)$  is a join space, in which

$$a \square b = \{g \in G \mid s(g) = s(a)s(b)\}.$$

## $H_v$ -STRUCTURES ASSOCIATED WITH $nF$ -HYPEROPERATIONS, $n = 1, 2, 3$

A. Iranmanesh, M.N. Iradmusa

In this paper, we introduce  $nF$ -hyperoperations ( $n = 1, 2, 3$ ) which generalize  $nP$ -hyperoperations. We construct certain  $H_v$ -rings, called " $nF-H_v$ -rings" from certain rings  $(R, +, \cdot)$  with  $nF$ -hyperoperations associated to  $+$ ,  $\cdot$  for  $n = 1, 2, 3$ . We study homomorphisms and isomorphisms on  $nF-H_v$ -rings and give the number of  $nF-H_v$ -rings associated to a finite ring for  $n = 1, 2$  and 3.

## CORRECTION TO HYPERNEAR-RINGS AND HYPERRINGS

Shalom Feigelstock